

TABLE 1-continued

	Pin No.				Motor operating direction	Remarks
	14 4th cam	13 Triplet cam	12	11		
Displayed though not intended	0	0	1	0	CW	
	0	0	1	1	CW	
	0	0	0	1	CW	
	1	0	0	0	CW	4th cam starts to rotate
	1	1	0	0	CW	
					CW	
Intended 8 brailles displayed	1	1	0	1	CCW	4th cam at 1st stop position
	1	1	0	0	CCW	Motor starts to reverse.
	1	0	0	0	CCW	Thereafter operates CW.
	1	0	0	1	CCW	4th cam remains stopped.
	1	0	1	1	CCW	
	1	0	1	0	CCW	
	1	1	1	0	CCW	
	1	1	1	1		
Displayed though not intended	1	1	0	1	CCW	4th cam starts to rotate.
	1	1	0	0	CCW	
	0	0	0	0		
	.	.	.	.	CCW	
	.	.	.	.		4th cam at 2nd stop position
	.	.	.	.		Operation repeated

In reference to FIG. 5, braille display instruction is received from a control unit (not shown) in Step S1. In Step S2, when the binary information to be indicated by the fourth pin 14 is "1" (projected), the process proceeds to Step S3 in which the stepping motor 3 operates clockwise as shown in FIG. 4(a) so that the fourth cam portion 8 is brought to the first stop position. In such state, four-bit binary information of "1011" is displayed by the pins 11, 12, 13 and 14.

The process then advances to Step S4 in which the stepping motor 3 steps in a counterclockwise direction or operation at an angular increment of 45°, as shown in FIG. 4(b), so that three pins 11, 12, 13 are selectively and independently actuated up and down. In the meantime, the fourth cam portion 8 remains at the first stop position so that the fourth pin 14 is left in the projected state.

Thus, consecutive seven counterclockwise steps at 45° increments performed by the stepping motor 3, starting from the state in which the fourth cam 8 is set to the first stop position, does not cause rotation of the fourth cam portion 8 so that the status of the fourth pin 14 (i.e., a projected state in this embodiment) is not changed during these seven counterclockwise steppings of the stepping motor 3. It is therefore possible to display eight patterns of information expressed by "1011", "0011", "0001", "1001", "1101", "0101", "0111" and "1111", out of the sixteen patterns which are available from the combination of the states of four braille pins 11, 12, 13 and 14, as will be seen from Table 1.

A further counterclockwise operation of the stepping motor 3 brings the driving projection 17 of the first cam portion 5 into contact with the driven projection 18 of the fourth cam portion 8, as shown in FIG. 4(c). Thereafter, as shown in FIG. 4(d), the fourth cam portion 8 is caused to rotate together with the triplet cam 4 to reach the second stop position, as shown in FIG. 4(e). In this state, the fourth pin 14 is held in the retracted position; thereby, indicating a binary value "0".

For information, initialization or one stepping motor 3 is possible by causing this motor 3 to perform several counterclockwise steps from the state shown in FIG. 4(e). Such

counterclockwise stepping of the stepping motor 3 brings the driving projection 17 of the triplet cam 4 into contact with the driven projection 18 of the fourth cam portion 8 which has been fixed against counterclockwise rotation, wherein the triplet cam 4 and, hence, the motor shaft 3a fixed to the triplet cam 4 is fixed against further counterclockwise rotation. When further driving voltage pulses are applied to the stepping motor 3 under such a condition, the stepping motor 3 is forced out of the phase so as to be initialized to the original position. Consequently, the stepping motor 3 is reset to the original position without aid of any sensing or detecting means. It is therefore possible to obtain an inexpensive binary information display apparatus which is simple in construction and small in size.

In reference again to Step S2 of the flow chart shown in FIG. 5, when the binary information to be indicated by the fourth pin 14 is "0" (retracted), the process proceeds to Step S5 in which the stepping motor 3 operates counterclockwise as shown in FIG. 4(e) so that the fourth cam portion 8 is brought to the second stop position. In this state, four-bit binary information of "0000" is displayed by the pins 11, 12, 13 and 14.

The process then advances to Step S6 in which the stepping motor 3 steps in the clockwise direction so that three pins 11, 12 and 13 are selectively and independently actuated up and down. In the meantime, the fourth cam portion 8 remains at the second stop position so that the fourth pin 14 is left in the retracted state.

Thus, consecutive seven clockwise steps at 45° increments performed by the stepping motor 3, starting from the state in which the fourth cam portion 8 is set to the second stop position, does not cause rotation of the fourth cam portion 8 so that the status of the fourth pin 14 (i.e., retracted state in this embodiment) is not changed during such seven clockwise steppings of the stepping motor 3. It is therefore possible to display another eight patterns of information expressed by "0000", "0010", "1010", "1110", "0110", "0100", "1100" and "1000", out of the sixteen patterns which are available from the combination of the states of four braille pins 11, 12, 13 and 14, as will be seen from Table 1.